GOVERNMENT OF INDIA : THE PATENT OFFICE, 214, LOWER CIRCULAR ROAD, CALCUTTA-17.

Specification No. 102678, filed 25th November 1965. [Post dated to 24th August, 1966 under Section 5 of the Indian Patents and design Act 1911] (Accepted 30th September, 1967)

Index at acceptance—70C5[VIII(5)].

IMPROVEMENTS IN OR RELATING TO ANODE-ELECTROLYTE SYSTEM FOR GALVANIC CELLS.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, Rafi Marg, New Delhi, India, an Indian registered body incorporated under the Registration of Societies Act (Act XXI of *1860*)

The following specification particularly describes and ascertains the nature of this invention and the manner in which it is to be performed.

This is an invention by DR. MICHAEL ANGELO VINCENT DEVANATHAN, Scientist, Central Electrochemical Research Institute, Karaikudi-3, Madras State, India, Ceylon citizen, Shri BALKUNJI ANANTHA SHENOI, Scientist, Shri PATTARAKALAM LUKA JOSEPH, Senior Scientific Assistant, and Shri VENKITARAMAN BALASUBRAMANIAN, Senior Laboratory Assistant, all of the Central Electrochemical Research Institute, Karaikudi-3, Madras State, India, all Indian citizens.

The invention relates to improvements in or relating to Anode Electrolyte Systems for Galvanic Cells.

Hitherto it has been proposed to use zinc, magnesium as anodes in electrolytes such as ammonium chloride, zinc chloride, magnesium chloride, sodium hydroxide, potassium hydroxide.

This is open to the objection that the use of zinc or magnesium requires a higher weight of the anode for the same current output than the present material and requires more costly electrodes. Moreover, zinc and magnesium are imported in India and hence involve foreign exchange.

The object of the invention is to obviate these disadvantages by using aluminium or aluminium based alloy anodes in the form of sheet casting or powder sintered with or without amalgamation and with or without inhibitor using manganese chloride as electrolyte.

To these ends, the invention broadly consists in using aluminium or aluminium based alloy in the form of sheet, cast, extruded, or powder sintered, as anode material and to use manganese chloride electrolyte with or without mercury salt and with or without inhibitors, and complexing agents.

The following typical examples are given to illustrate the invention.

EXAMPLE I (a)

Anode	Electrolyte		Cathode
Aluminium	Manganese Chloride	5-50%	Air depolarized cathode
	Mercuric chloride	0.5 gpl-5 gpl	
	Tetra alkyl ammonium salt	0.5-10 gpl	
	Sodium citrate	5-25 gpl	
	Rest water.		

The open circuit voltage of the above cell system is 1.65V and closed circuit voltage 10 ohms load is 1.45 V.

EXAMPLE I (b)

Anode	Electrolyte		Cathode
Aluminium	Manganese chloride	5-50%	Air depolarized cathode
	Mercuric chloride	2-5gpl	
	Rest water.		

The open circuit voltage is more than 1.4 V and closed circuit voltage is 1.25 V under 1mA/Cm² current density.

EXAMPLE I (c)

Aluminium	Manganese chloride	5-50%	Air depolarized cathode
	Mercuric chloride	1-5 gpl	
	Borax	3-20 gpl	
	Rest water.		

The open circuit voltage is 1.4 V and closed circuit voltage 1.25 under 1mA/Cm² current density.

EXAMPLE II (a)

Aluminium	Manganese chloride	5-50%	Iron or steel cathode
	Mercuric oxide, Potassium iodide	0·5-5 gpl each	
	Alkyl pyridinium halide	0·1-5 gpl	
	Rest water.		

The voltage of the above cell system is 0.7 V.

EXAMPLE II (b)

Aluminium	Manganese chloride	5-50%	Iron or steel cathode
	Mercuric chloride	2-5 gpl	
	Rest water.		

The voltage of the above cell system is 0.7 V.

Price: TWO RUPEES.

EXAMPLE III

Amalgamated aluminium treated in Inhibitor solution.	Manganese cloride	10-50%	Manganese dioxide + carbon
	complexing agent like citrate or tartrate or EDTA	5-25 gpl	
	Rest water.		

The open circuit voltage of the system is 1.7V and closed circuit voltage is 1.6V under 10 ohms load.

EXAMPLE IV

Aluminium	Manganese chloride	10-50%	Manganese dioxide + Carbon
	Rest water.		

The open circuit voltage of the above system is 1.5 V and closed circuit voltage under 10 ohm load is 1.35 V.

EXAMPLE V

Aluminium	Manganese chloride	10-50%	Manganese dioxide + Carbon
	Mercuric chloride	1-5 gpl	
	Rest water.		

The open circuit voltage of the system is 1.9 V and closed circuit voltage is 1.7 V under 10 ohm load

EXAMPLE VI

Aluminium	Manganese chloride	10-50%	Manganese dioxide + Carbon
	Mercuric chloride	1-5 gpl	
	Borax	3-20 gpl	
	Rest water.		

The open circuit voltage is 1.8 V and closed circuit voltage under 10 ohm load is 1.75 V.

We claim :

1. An anode electrolyte system where aluminium or aluminium based alloys are used along with manganese chloride electrolyte as illustrated in Examples I to VI.

2. An anode electrolyte system where the current efficiency of the order of 85 per cent. is obtained when the anode electrolyte system of examples 1 to 6 is used as opposed to 65 per cent. efficiency in other neutral electrolytes.

3. An electrolyte system where aluminium or aluminium based alloys in manganese chloride solution containing mercury compound giving an anode potential of about 400 mV higher than that without mercury salt.

4. An amalgamated aluminium or aluminium anode in manganese chloride electrolyte giving a potential of 400 mV higher as in example III.

5. An anode of aluminium or aluminium alloy in manganese chloride electrolyte containing mercury compounds and inhibitors as in Examples I a & II a to reduce the self corrosion of aluminium.

6. An anode electrolyte system where aluminium or aluminium alloys containing mercury salt and complexing agents as in Examples Ia, Ic, III & VI wherein the formalion of solid reaction product is avoided.

R. BHASKAR PAI,

PATENTS OFFICER,

Council of Scientific & Industrial Research.

Dated this 20th day of August, 1966.

MGIPC S—Confdl.—69/163/5 Patent--25-10-72—100.